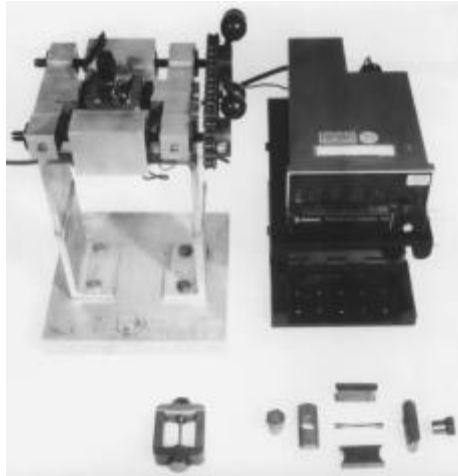


Annex A

Figures



(A) Device and Frames Used to Stress Round Tensile Specimens

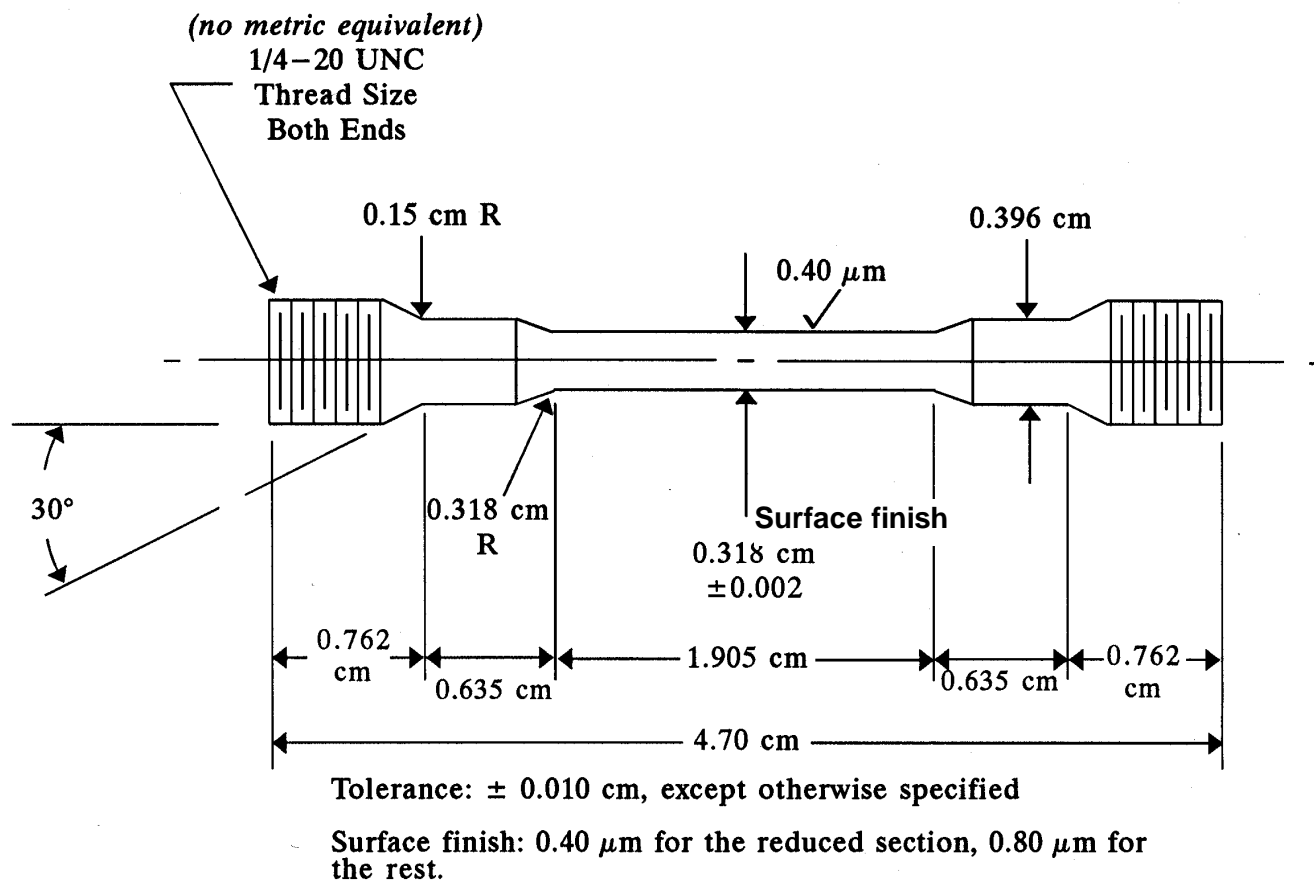


(B) Alternate Immersion Tester (The specimens stay 10 minutes in a 3,5-% NaCl solution, followed by a 50-minute drying cycle. This cycle is repeated for the entire duration of the test (ISO 11130)).



(C) Salt Spray Cabinet (Maintains a 5-% salt spray inside the test cabinet per ISO 9227.)

Figure 1. Typical Equipment Used for Stress-Corrosion Evaluations.



Notes:

1. Thread dimensions must be as specified (measurement by fabricator is mandatory).
2. No undercutting of radii permitted.
3. Gage section to be concentric with axis within 0.005 cm TIR and parallel.
4. No file marks or nicks permitted within gage section.

Figure 2. Typical Round Tensile Specimen Configuration

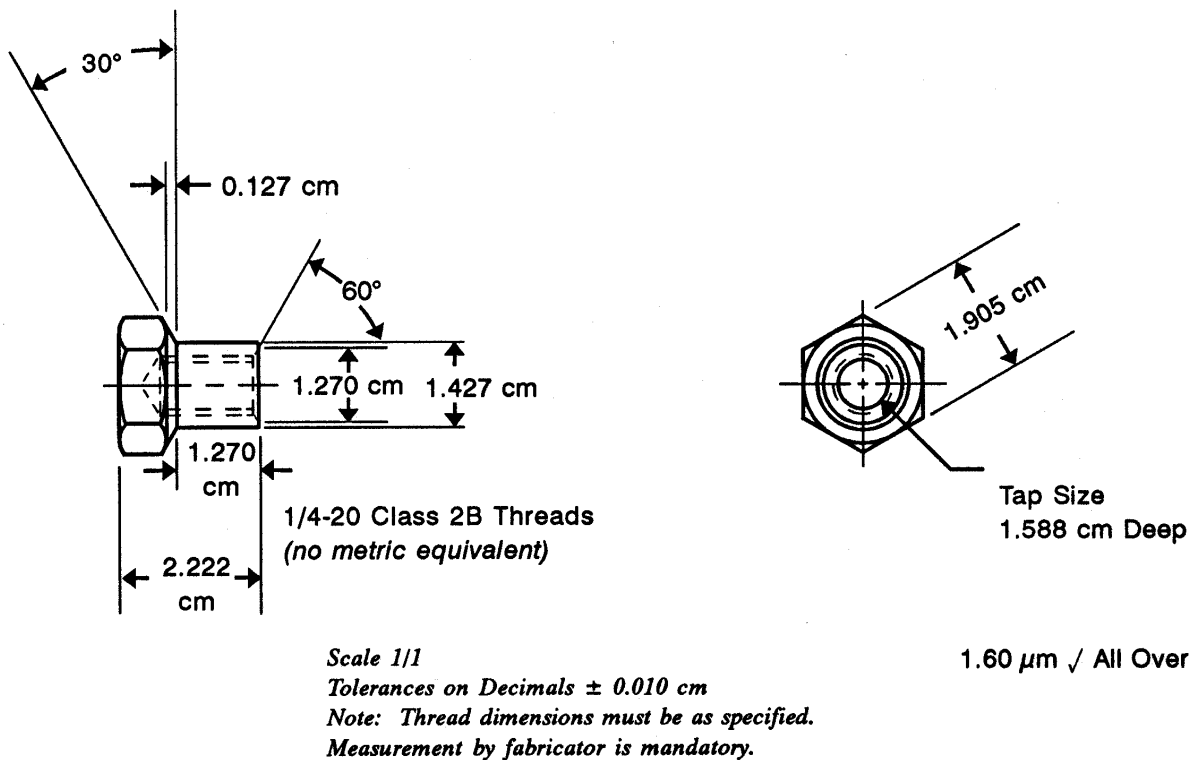
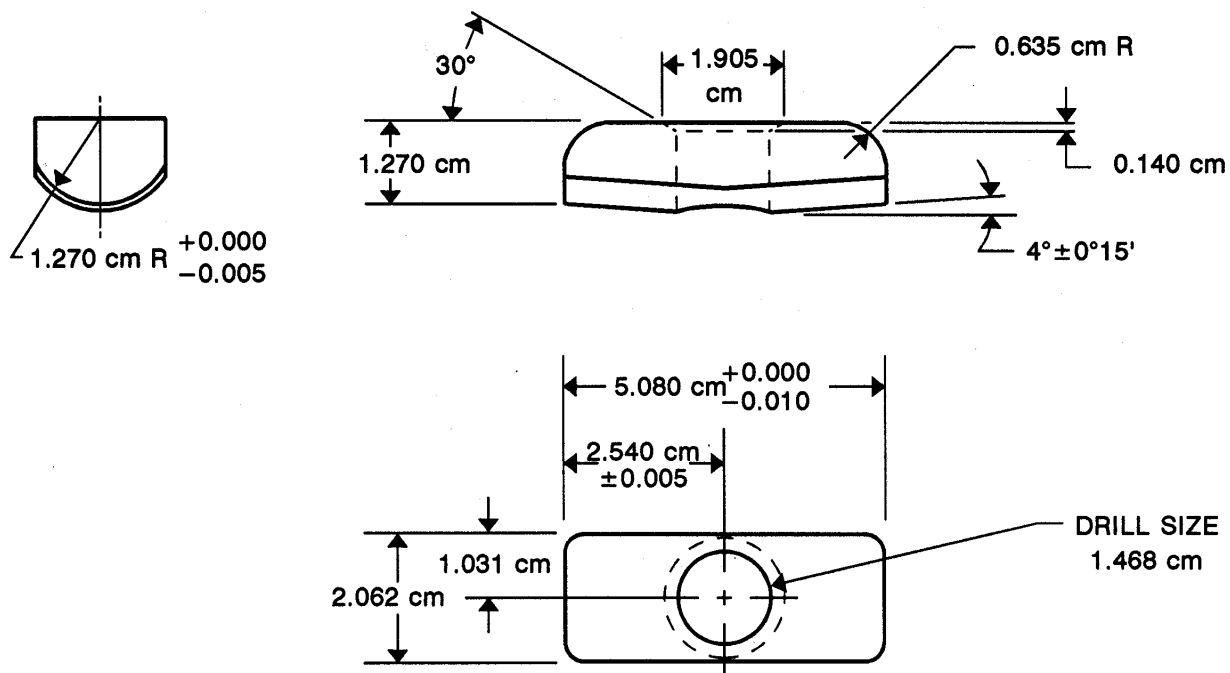
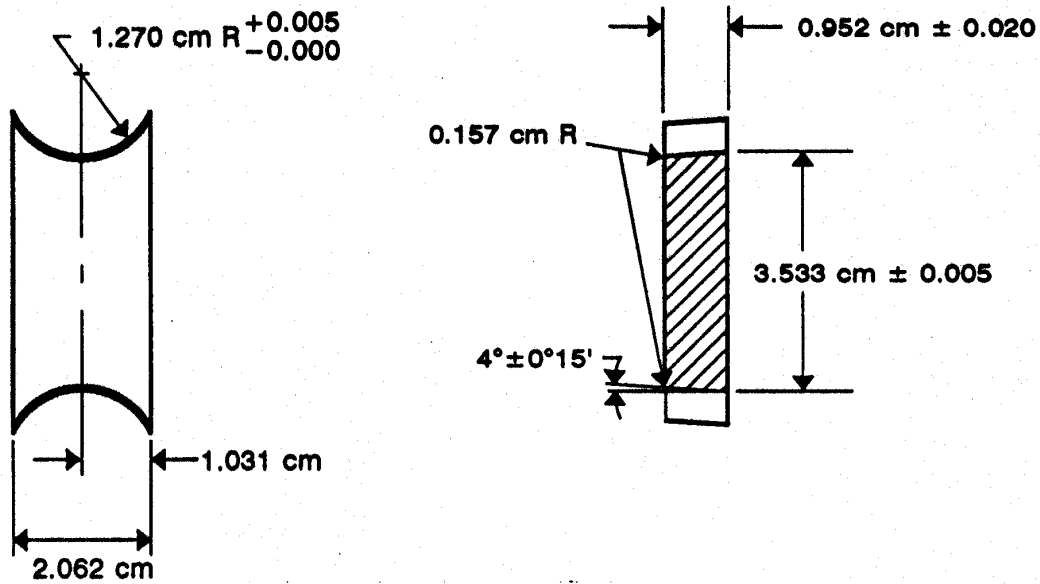


Figure 3. Stress-Corrosion Frame Nut Used in the Constant Strain Loading Assembly for Round Tensile Specimens



Notes: Unless otherwise specified tolerances on decimals ± 0.010 cm, surface finish 1.60 μm all over

Figure 4. Stress Corrosion Frame Crosshead Used in the Constant Strain Loading Assembly for Round Tensile Specimens



Notes: Unless otherwise specified tolerances on decimals ± 0.010 cm, surface finish $1.60 \mu\text{m}$ all over

Figure 5. Stress Corrosion Frame Sidebar Used in the Constant Strain Loading Assembly

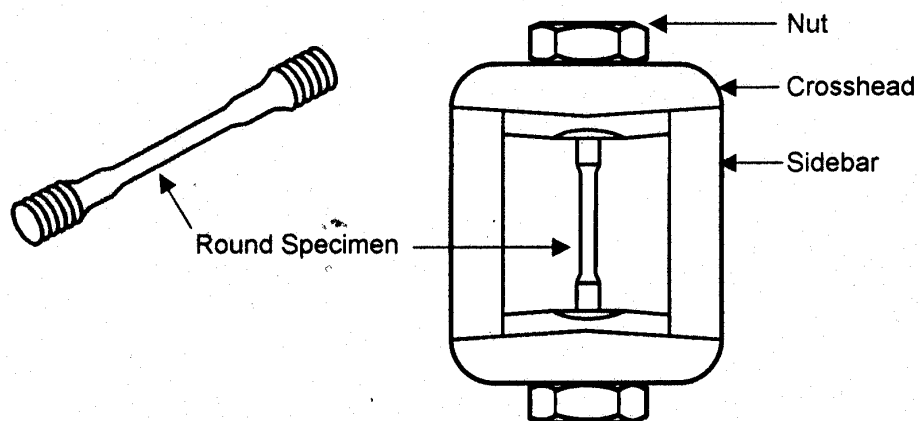
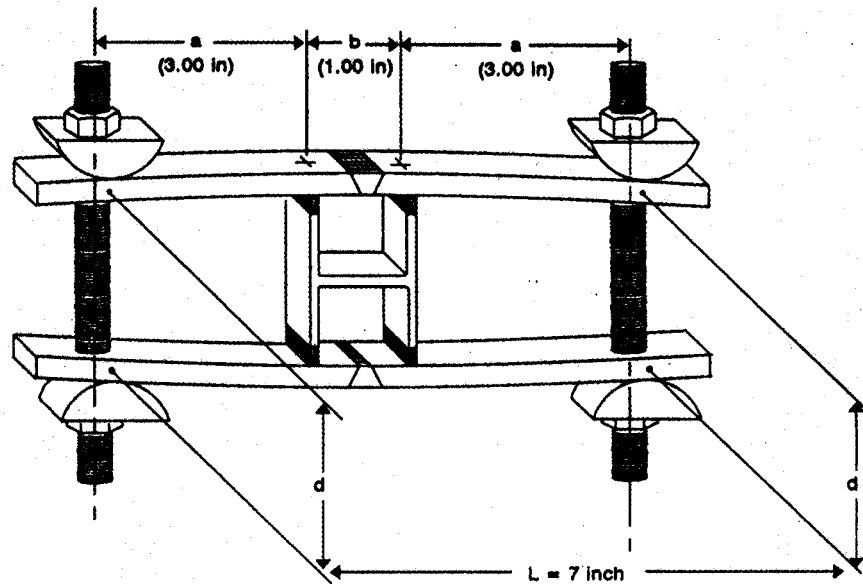


Figure 6. Constant Strain Round Specimen and Frame



Stressing Formula

$$\Delta d = 2fa(3L-4a)/(3Et)$$

Where Delta d = Deflection in inches measured at centerline of bolts

f = Desired stress in psi

L, a, and t = Marked on Drawing

E = Modulus of elasticity

Figure 7. Bent Beam Assembly

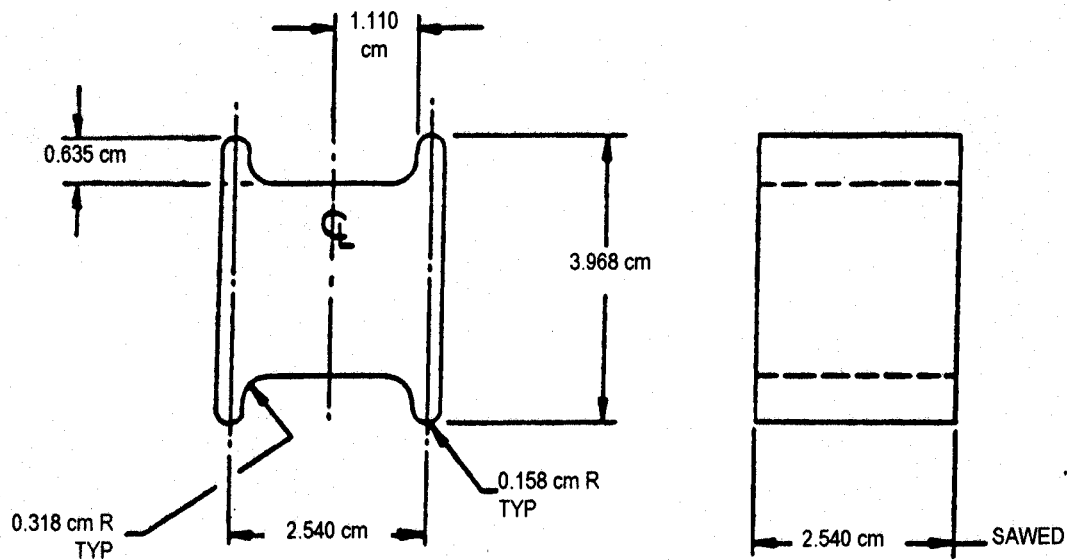


Figure 8. Fixture for Bent Beam Stress Corrosion Assembly

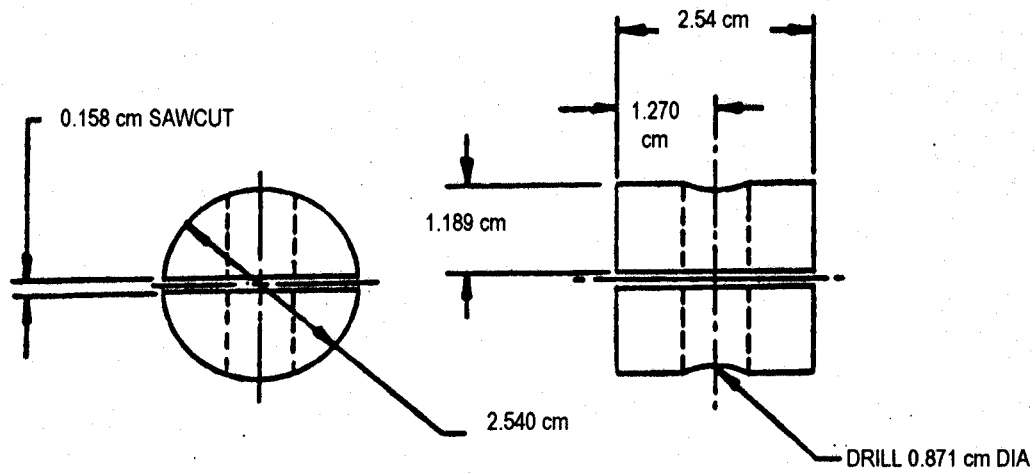


Figure 9. Rocker for Bent Beam Stress Corrosion Assembly

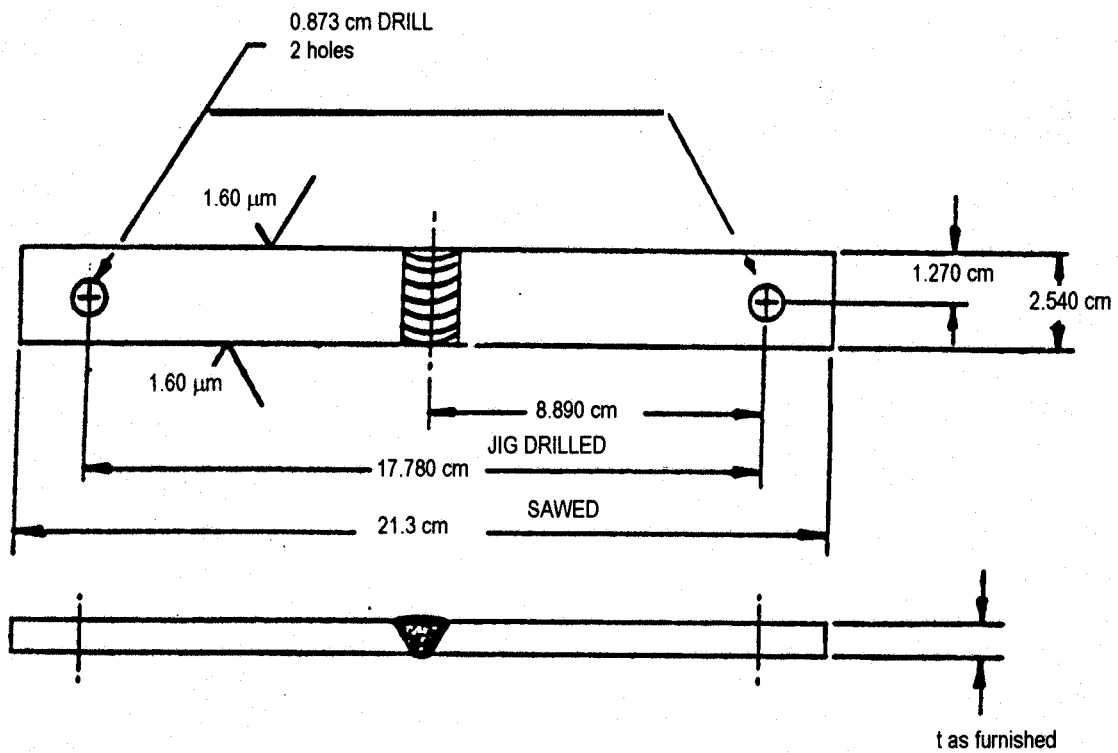
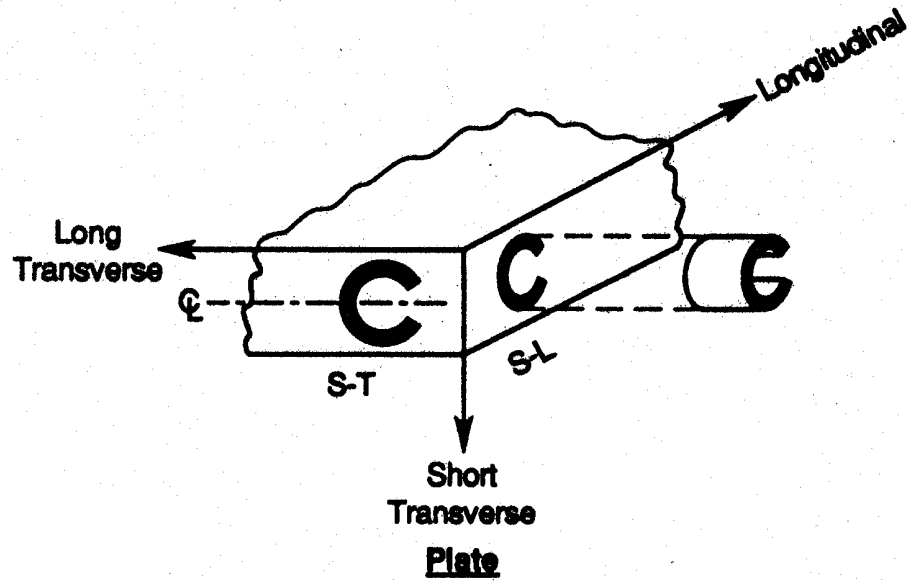


Figure 10. Bent Beam Specimen



C-rings are commonly used to test the short transverse direction of plate material when round specimens cannot be fabricated.

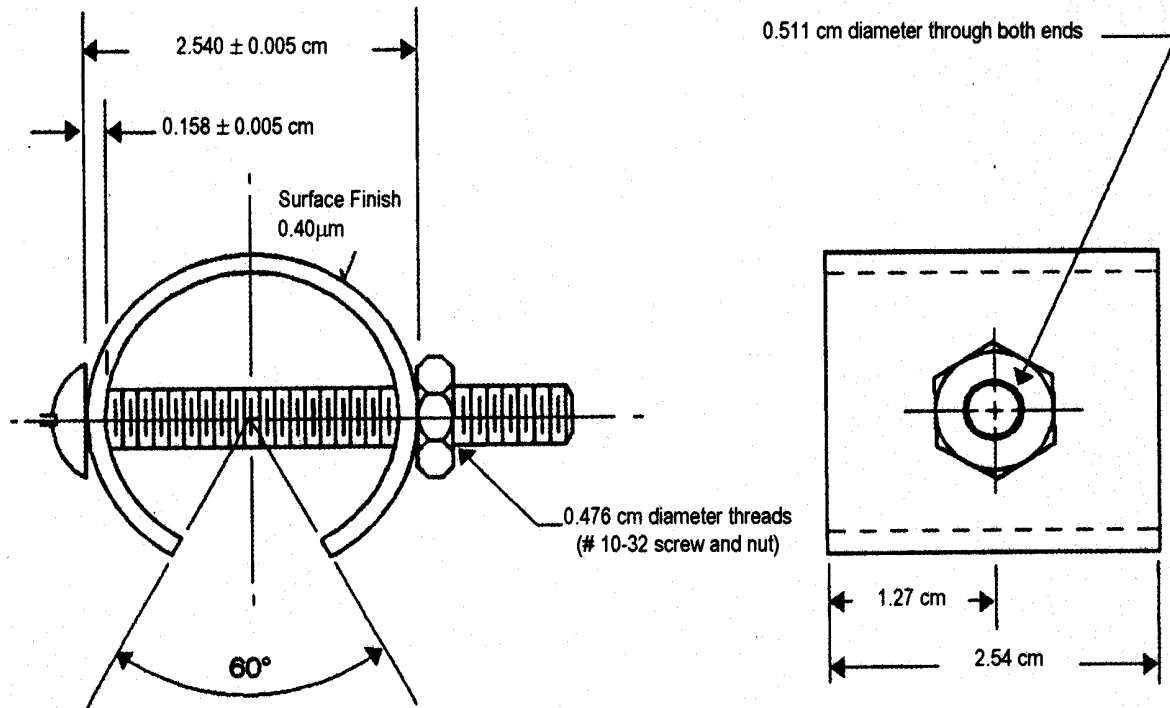
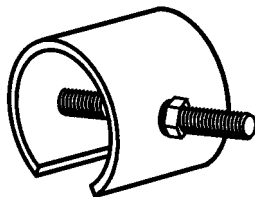


Figure 11. Typical C-Ring Specimen Configuration



The final diameter (OD_f) required to give the desired stress on the C-rings is calculated using the following equations:

$$OD_f = OD - \Delta, \text{ and}$$

$$\Delta = f\pi D^2/4EtZ$$

where:

OD = outside diameter of C-ring before stressing, mm (or in),

OD_f = outside diameter of stressed C-ring, mm (or in),

f = desired stress, MPa (or psi) (within the proportional limit),

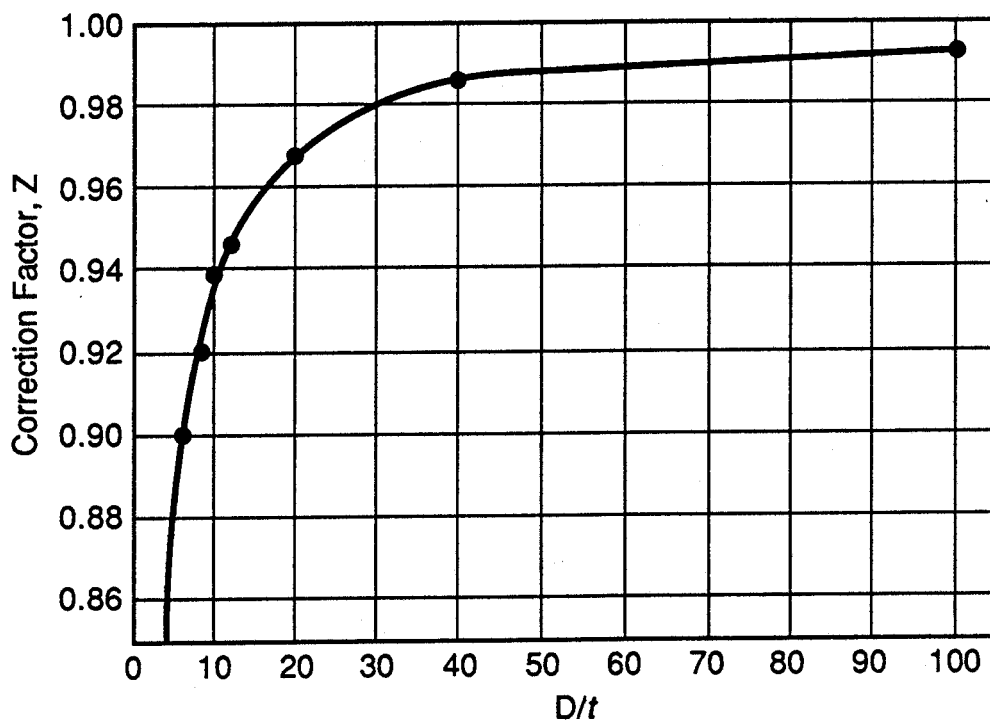
Δ = change of OD giving desired stress, mm (or in),

D = mean diameter ($OD - t$), mm (or in),

t = wall thickness, mm (or in),

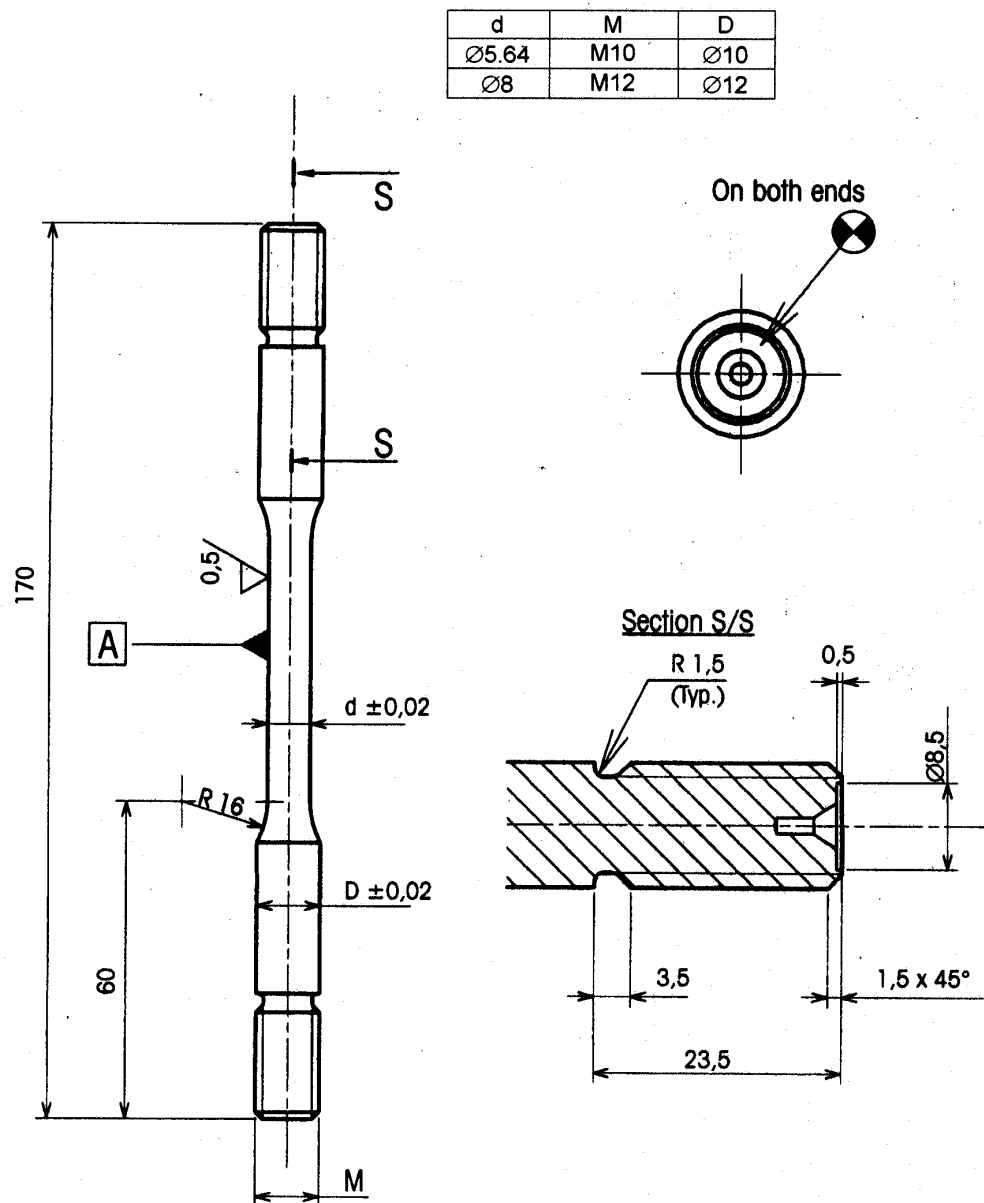
E = modulus of elasticity, MPa (or psi), and

Z = a correction factor for curved beams (see Figure A1.1).



Correction Factor for C-Ring Deflection Equation

Figure 12. Formula for Stressing C-Rings

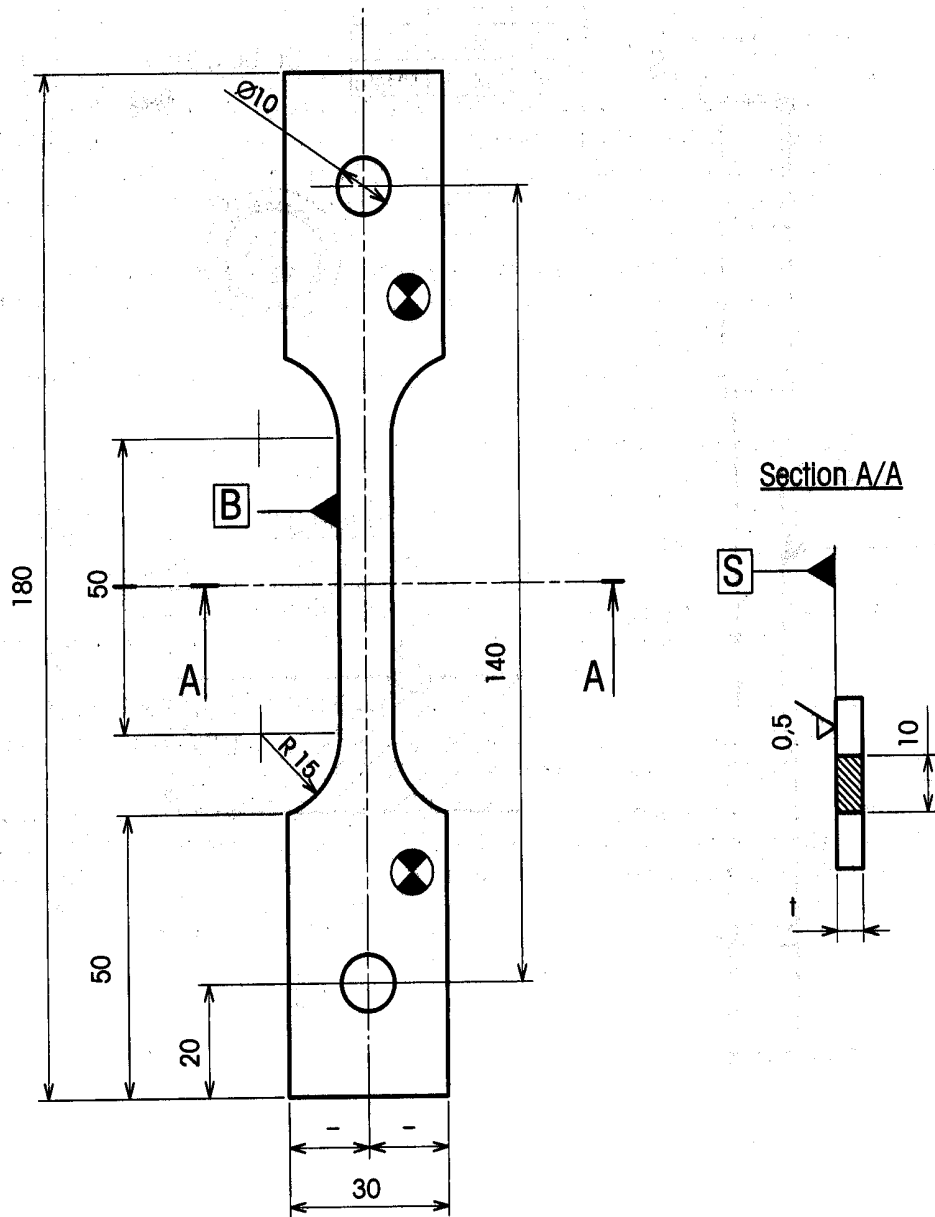


Notes:

1. Remove all sharp edges
2. The specimen should be fully symmetric
3. Sample identification by 1 to 9
Letter height is 1,5 and location is marked
4. Dimensions of drawing in mm and not to scale

Overall geometric tolerances	
General dimensions	: Js13; js13
Surface roughness	: 1,6 µmm
Cylindricity	: $\sqrt{0,01}$
Symmetry	: $\equiv 0,1$
Concentricity	: $\odot 0,03$ A

Figure 13. Typical Turned Stress Corrosion Test Specimen Used in the Constant Load Method



Notes:

1. Remove all sharp edges
2. The specimen should be fully symmetric
3. Sample identification by 1 to 9
Number height is 3,5 and location is marked
4. t; Thickness typically 5 mm. However could vary according to product thickness and testing device loading capability
5. Dimensions of drawing in mm and not to scale

Overall geometric tolerances	
General dimensions	: Js13; js13
Surface roughness	: 1,6 μ m
Flatness	: ∇ 0,05/100
Parallelism	: // 0,02/100 [S and t]
Perpendicularity	: \perp 0,02 [B]
Symetry	: \equiv 0,02

Figure 14. Typical Flat Stress Corrosion Test Specimen Used in the Constant Load Method

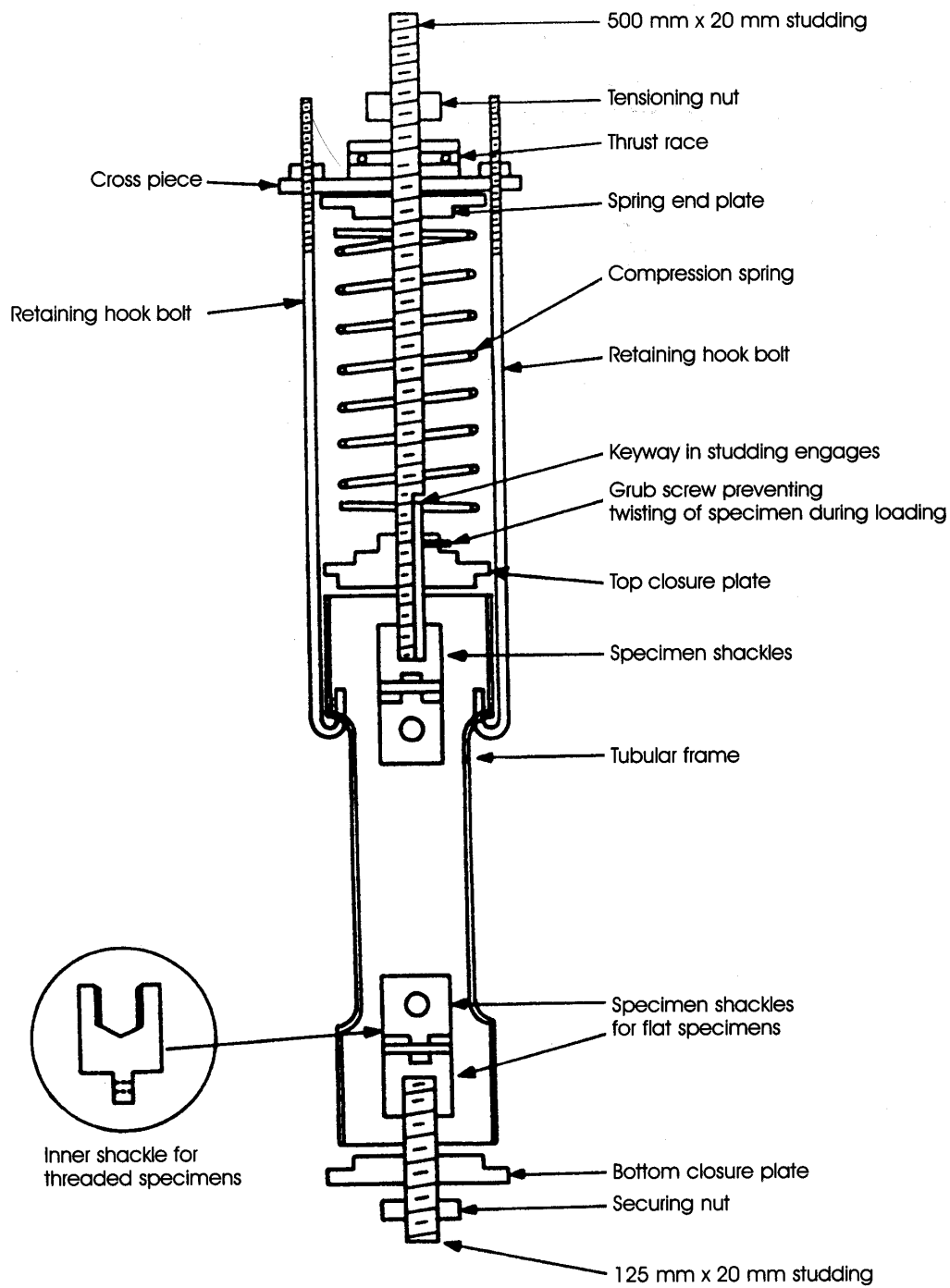


Figure 15. Cross-Section of Stress Corrosion Jig Used in the Constant Load Method

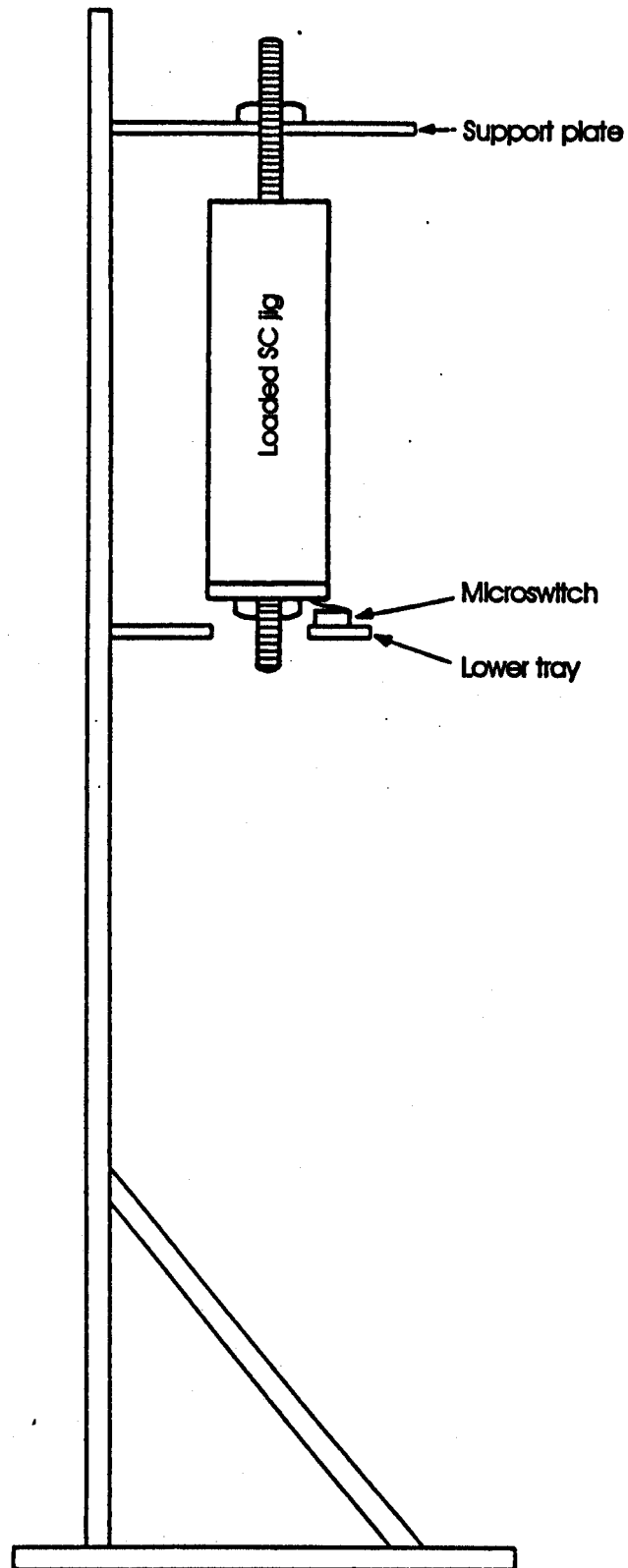


Figure 16. Support Frame for Stress Corrosion Jig Used in the Constant Load Method

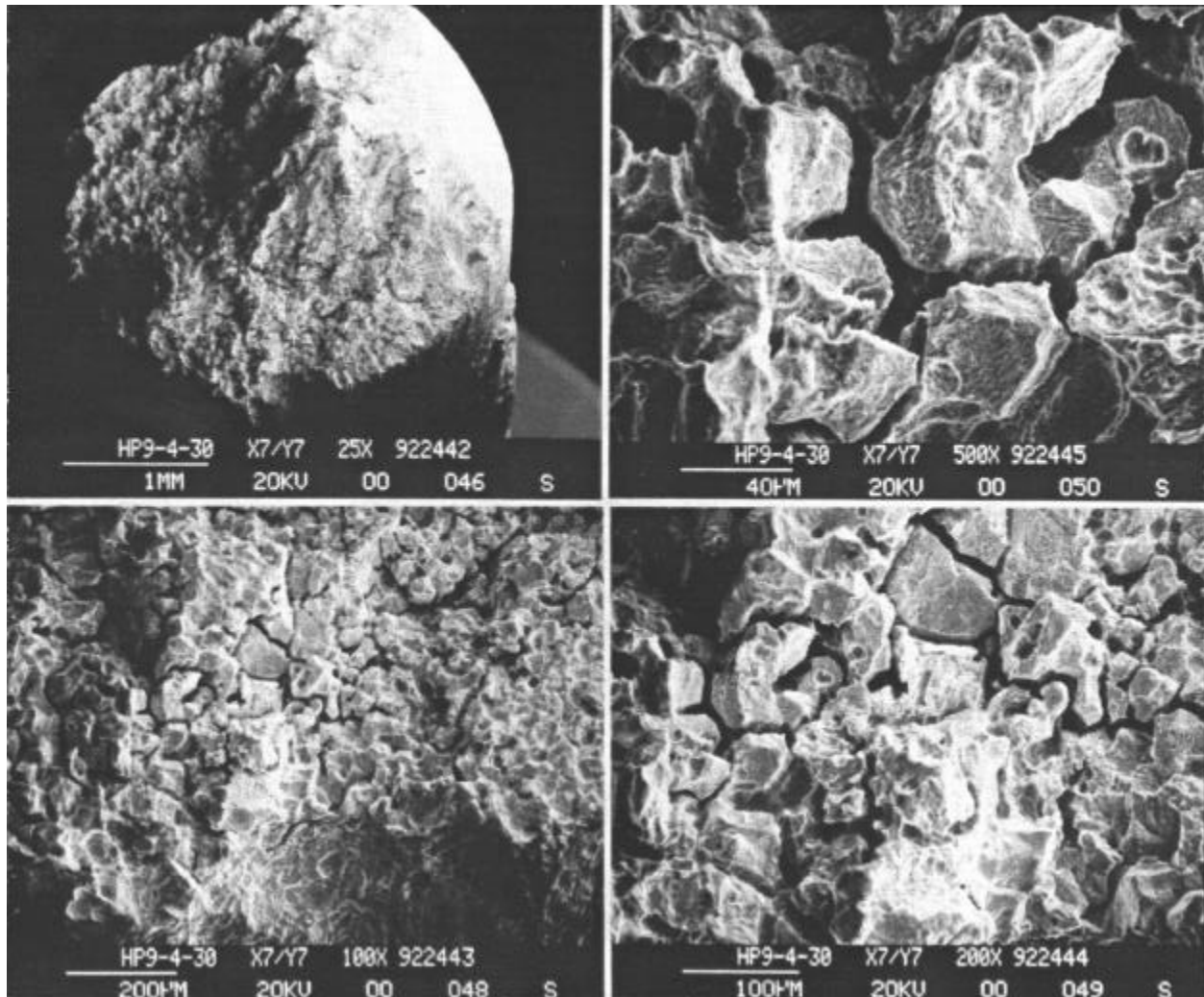
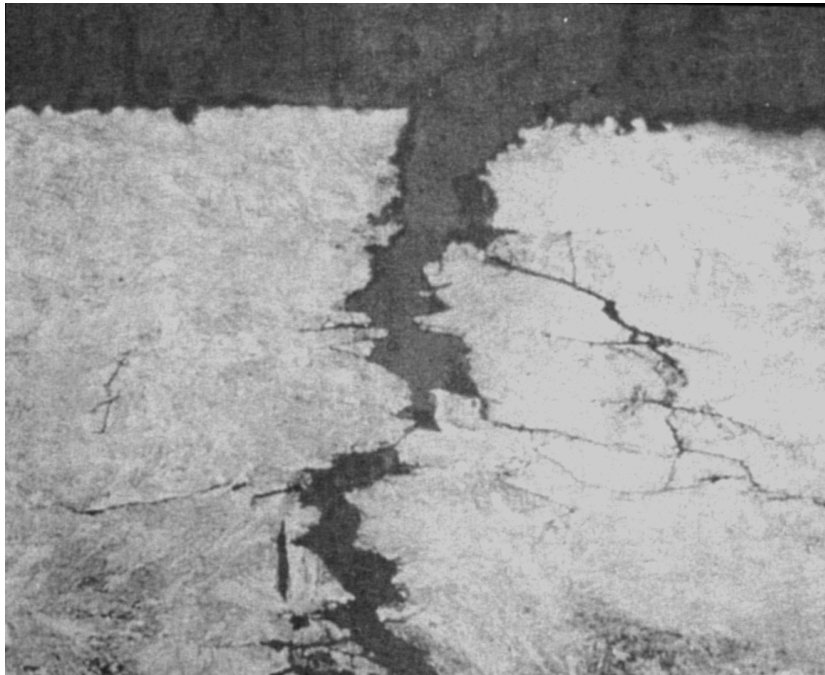
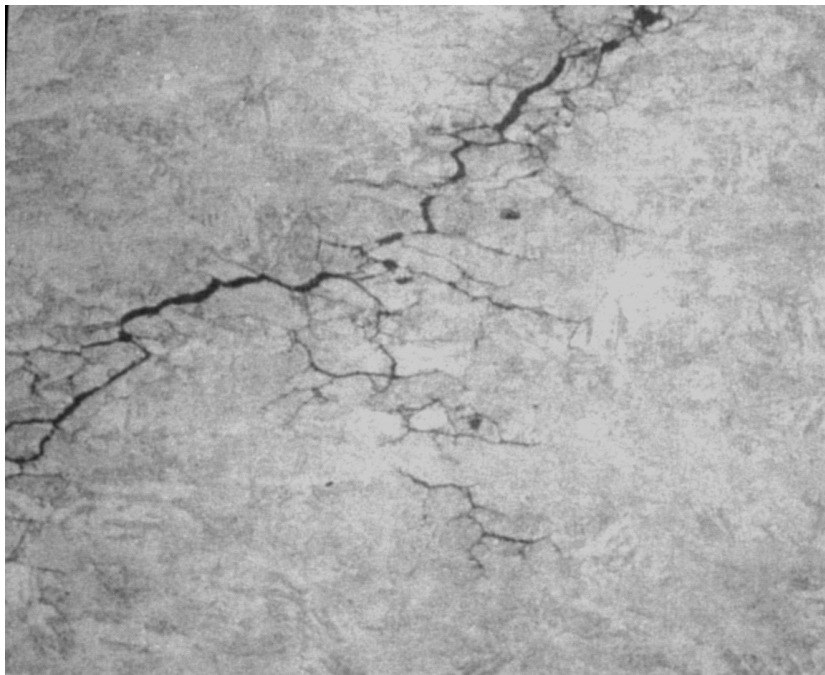


Figure 17. Scanning Electron Microscope Views of an HP 9-4-30 Weld Stress Corrosion Cracking Failure



Longitudinal

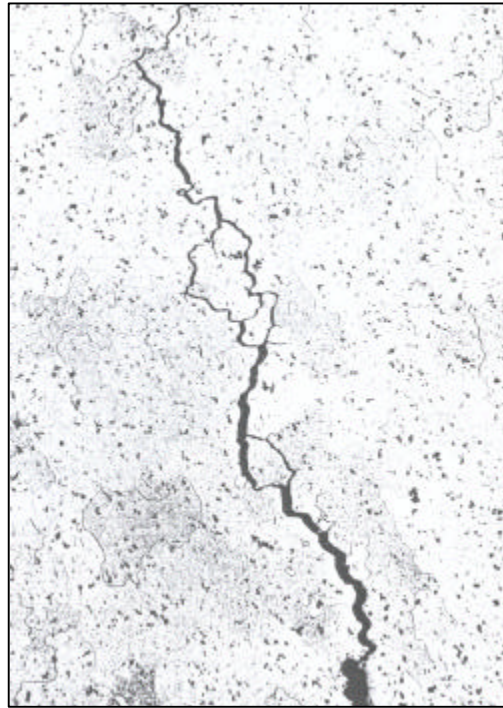
Mag. 200X



Transverse

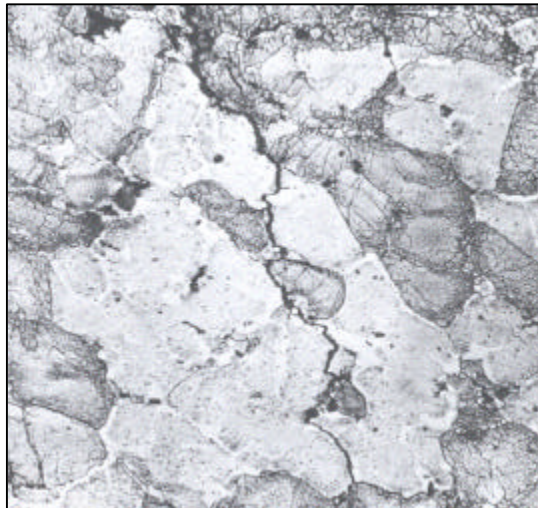
Mag. 200X

Figure 18. Metallographic Views of a Maraging Steel 200 Stress Corrosion Cracking Failure



Transverse Mag. 100X

Figure 19. Metallographic View of an Aluminum 2024-T4 Stress-Corrosion Cracking Failure



Transverse Mag. 100X

Figure 20. Photomicrograph of an Aluminum 7075-T6 Stress-Corrosion Cracking Failure